United States Patent Office 2,811,454 Patented Oct. 29, 1957

2,811,454

MEAT WRAPPING SHEET

Ralph Pressman, Sierra Madre, Calif., assignor of twenty-five percent to Norman Dartell, Los Angeles, Calif.

No Drawing. Application August 16, 1954, Serial No. 450,257

7 Claims. (Cl. 99—171)

This invention relates to food wrapping materials, and particularly to wrappers for meats for storage and/or freezing purposes.

Heretofore such wrapping sheets have been used as water-repellent or -impervious sheets for display, storage or freezing purposes. The present invention, however, extends the utility of said wrappers by combining a preservative, tenderizing and anti-oxidant effect with the said protective action. Such protective action merely seals the foods against dust and moisture, or prevents loss of water, as the case may be. However, my invention provides a coating to the same which has various effects upon the foods so protected and which coating will tenderize, anti-oxidize, or otherwise preserve the foods in contact with it. Thus, the wrapping media will gain added functions to expand their utility.

The protective wrappers heretofore used are films or sheets of either the transparent type, such as polyethylene film, or of the semi-transparent type, such as parchment or waxed paper, or of the opaque type, such as metallic foil, or a film formed in situ on the food by spraying. The purpose of such wrapping media is to package meats, fish and game to retard or prevent spoilage and dehydration or hydration, and/or that they may be kept in a deep freeze for reasonably extended periods without damage to the foods.

According to this invention, I propose to coat the said wrapping sheets with substances having various effects on the foods to be contained therein, as will be later described, and to prepare said coating so that it will be adherent and elastic under the various conditions of use. In the specific examples to be shown later, I have provided the said coating on the wrapping medium so as to have a tenderizing and flavoring action upon the food with which it comes in contact. Other applications will be indicated for those versed in the art.

The example of a coating here referred to contains a suspension of a proteolytic enzyme or its derivates in admixture with certain ingredients to maintain its activity, and an activator and anti-oxidant, which enzyme is held in colloidal suspension in an adhesive medium to adhere to the wrapping sheet without substantial loss of its enzymatic activity.

The tenderizing action on meat of proteolytic enzymes springs from their ability to attack proteins, proteoses and peptones, changing them into easily digestible polypeptides and amino acids. There are several such enzymes known: Papain, rennin, pepsin, trypsin, the class of Protaminases and Polypeptases. Of these enzymes, particularly for meat tenderizing, I prefer papain as a practical source, owing to its availability on the open market and its comparative abundance. I prefer to use the latex of the fruit of *Carioca papaya*, or other fruits containing papain, as my enzyme source without separating the chemically pure papain. To prepare the papain of the market, I set out to standardize its potency and use it in proportion to its activity or potency. Usually about 8% to 12% papain is sufficient in the coating.

I experienced difficulties in producing an adherent and flexible coating of the papaya suspension on the water-repellent or -impervious sheeting, and only after prolonged trials found conditions that made the composition workable. To produce reliable adherence and flexibility of the coating defying embrittlement in creasing and at freezing temperatures, I found that algin or the salts of alginic acid added in proportion of 0.1% to 0.3% to the coating produced a desired film. Of the various adhesives usable—acacia, gum tragacanth, karaya, locust bean, Irish moss, polyvinyl pyrrolidine, carboxymethylcellulose, gelatine, agar—I have found the alginates as best suitable. However, any of the other adhesives may be used with the proper adjustment of the ingredient proportions.

The activity of proteolytic enzymes declines with age until eventually they become totally inactive. I have found it necessary to overcome this condition by the addition of an anti-oxidant. In the case of papain, which is used as a proteolytic enzyme in the example herein shown, I have found ascorbic acid to be the most effective anti-oxidant, which I use in 4% to 6% proportion of the coating formula. A simultaneous and vital role of ascorbic acid is that of reducing the pH of the coating solution (suspension) because in the given example the enzyme works best at 3.5 to 4.0 pH, which the said addition of ascorbic acid brings about. Other enzymes or combinations of enzymes will show other pH minimums for maximum activity, but in any case the pH should be below 4.5.

To promote increased osmotic diffusion rates of the enzymes from the coating into the wrapped products, I have found it expedient to add salt to the coating. Such addition is especially useful during the defrosting or thawing stage when the diffusion of fluids is at its lowest rate.

Another addition to said coating is made for the purpose of preserving the solution equilibrium during the osmosis of the highly saline enzyme solution, which addition also enhances the flavor of food products. This addition is mono-sodium- or potassium-glutamate.

The activity of enzymes is influenced by:

(1) *Temperature.*—The velocity of action increases with rising temperature to an optimum, after which it again declines.

(2) *pH.*—The activity usually follows a curve up to an optimum of pH, and is also dependent on the temperature.

(3) *Activators.*—The pH-curve of activity velocity is greatly affected by the presence of certain specific activators.

In the example shown here of an enzyme coating, I have used cysteine hydrochloride as an activator in 0.1–0.3% weight proportion of the coating formula.

After compounding the various ingredients into a coating suspension, it is applied in a thin film over the wrapping medium on one side (paper, film, metal foil, etc.) and after the said coating has set, the coated wrapping sheet is ready for use. Or, the film coating may be sprayed or dipped onto the food and set into a rigid layer in situ, the enzyme agent being a component of said coating film.

If an active coating is employed only on one side of the wrapping sheet, the active coat is to be arranged next to the product to be wrapped.

An example of the use of my invention will be shown below, where the active coating adhering to the wrapping sheet is a proteolytic enzyme, in particular papain, which coating produces a tenderizing and flavor-increasing effect upon meats, fish and game wrapped in said wrapping medium for the protection thereof during and